

NOTES ON SYSTEMATICS AND BIOLOGY OF *TRICHAULAX* KRAATZ (COLEOPTERA: SCARABAEIDAE: CETONIINAE)

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The flower chafer genus *Trichaulax* from Australia and New Guinea is discussed and five species are recognized and keyed: *T. nortoni* Butler, *T. marginipennis* (Macleay), *T. concinna* (Janson), *T. macleayi* (Kraatz) stat. rev. and *T. philipsii* (Schreibers). *T. sericea* Janson is proposed as a junior synonym of *T. macleayi* and *T. trichopyga* Thomson is proposed as a junior synonym of *T. nortoni*. Distributional data are presented for all species. Breeding biology is summarized and adult nectar sources are listed.

Introduction

Krikken (1984) placed the genus *Trichaulax* within the cetoniine tribe Schizorhinini, subtribe Schizorhinina. Many species now grouped under *Trichaulax* have in the past been placed in *Schizorhina* Kirby and there has been considerable confusion over the use of correct specific names (Lea 1914). Krikken (1984) considered *Schizorhina* to be monotypic. The Junk Coleopterorum Catalogus (Schenkling 1921) erroneously uses the name *T. trichopyga* (Thomson) for *T. nortoni* (pers. comm. M. Bacchus).

Genus *Trichaulax* Kraatz

Trichaulax species are easily recognized and separated from other genera of Australian Cetoniinae by the presence of hair-like vestiture adorning the elytra, which, in most species, is arranged in prominent longitudinal bands. In all *Trichaulax* the outer edge of the female fore tibia bears three teeth, while that of the male bears only a single terminal tooth. All species have the hind tarsus longer in the males than in the females. This condition is most marked in *T. nortoni* and least so in *T. concinna*. The males of all species have a longitudinal groove along the mid-line of the abdominal sterna. Females lack this groove, the sterna being entirely convex and completely uninterrupted.

The genus doubtless occurs in all Australian states except Tasmania but there are still no confirmed records from the Northern Territory. The only species to occur outside Australia is *T. macleayi* which occurs in both Queensland and New Guinea.

Abbreviations

In the text the following abbreviations are used: (AH) Collection of Anthony Hiller, Mt Glorious, Qld; (AM) Australian Museum, Sydney, NSW; (ANIC) Australian National Insect Collection, Canberra, ACT; (IFTA) Insect Farming and Trading Agency, Bulolo, Papua New Guinea (JHT) Collection of Jean Harslett, Amiens, Qld; (JH) Collection of Jack Hasenpusch, Innisfail, Qld;

(JS) Collection of Joseph Sedlacek, Brisbane, Qld; (MV) Museum of Victoria, Melbourne, Vic; (PGA) Collection of P.G. Allsopp, Bundaberg, Qld; (QDF) Queensland Forest Service, Indooroopilly, Qld; (QDPI) Queensland Department of Primary Industries, Brisbane, Qld; (QDPIM) Queensland Department of Primary Industries, Mareeba, Qld; (QM) Queensland Museum, South Brisbane, Qld; (RE) Collection of R. Eastwood, Nambour, Qld; (SL) Collection of S. Lamond, Sydney, NSW; (UQIC) University of Queensland Insect Collection, St Lucia, Qld; (WH) Collection of Allan Walford-Huggins, Yeppoon, Qld. A ? in material examined indicates the sex of the specimen could not be determined.

Key to Species of *Trichaulax*

1. Derm of dorsal surface metallic green; scutellum indented in centre *concinna*
Derm of dorsal surface black or brown, never green; scutellum not indented in centre 2
2. Elytral vestiture bicoloured, whitish in elytral sulci and orange at elytral apices *nortoni*
Elytral vestiture not bicoloured 3
3. Elytral sulci shallow and narrow; elytral vestiture always whitish *marginipennis*
Elytral sulci broad and deep; elytral vestiture usually ochraceous or rust-red 4
4. Derm of dorsal surface always black; vestiture deep rust-red; parameres of male narrow and parallel-sided (Figs 5, 6); New Guinea and far northern Queensland *macleayi*
Derm of dorsal surface black or brown; vestiture paler, ochraceous or whitish; parameres broader, widening towards apex (Figs 1, 2); southern Australia and east coast north to Mt Garnet, Queensland *philipsii*

Trichaulax nortoni Butler

(Figs 9, 10, 19, 22)

Schizorhina nortoni Butler, 1865: 161.

Schizorhina trichopyga Thomson, 1878: x, new synonymy.

Trichaulax marginipennis Froggatt (nec Macleay), 1907: 162;
Schenkling 1921: 187.

Adult (Figs 19, 22)

This is the second largest *Trichaulax* species (males, length 22-32 mm, width 15-19 mm; females, length 25-31 mm, width 15-18 mm).

Specimens from northern Queensland tend to be somewhat smaller than southern examples.

This species is singular within the genus in bearing vestiture of two colours, that within the fine shallow dorsal sulci being off-white, while the pygidium, ventral surface and elytral apices are clothed in orange.

Adults are easily separated from large specimens of *T. macleayi* by the narrower condition of the elytral sulci and by the bicoloured vestiture. Confusion with *T. marginipennis* is avoided by the presence of the orange vestiture on elytral apices and pygidium.

The parameres are broad and the interstice between them pyriform (figs 9, 10).

Material Examined

Queensland: 2♀, Cairns (JHT, JS); 2♂, 3♀, Kuranda (AH, AM, ANIC, JHT, QM); 2♂, 3♀, Mt Glorious (AH); 1♂, 1♀, Beacon Hill, nr Imbil (RE). 5♂, 8♀, no data (ANIC, JS, QM, UQIC).

Distribution

Cairns to Mt Glorious. Illidge (1917) recorded the species from Gympie and noted that a specimen from that locality became the type of Thomson's *T. trichopyga*, although Thomson's description cites the type locality only as "Australia". The preferred habitat appears to be rainforest and adjacent communities. The type specimen of *T. nortoni*, accessed by the British Museum in 1865, is labelled "Sydney" but this locality would appear to require confirmation. The apparent disjunct distribution between northern and southern Queensland may be due to lack of collecting between the three confirmed localities and probably the species occurs between these areas where there is suitable habitat.

Biology

Adults of *T. nortoni* have been taken in January and February in northern Queensland, and in February and March in southern Queensland. The northern populations feed on *Eucalyptus* blossom.

At Mt Glorious the flight period is from approximately 10 am to 3 pm and adults have been collected from flowers of *Euodia micrococca* F. Muell. (Fig. 22) and *Eucalyptus intermedia* R. Baker, often preferring the topmost crown of the tree. The beetles are active on the hottest, brightest and most humid days.

Predators of the adult beetles have not been recorded but *Dacelo novaeguineae* (Hermann), the common kookaburra, has been seen to take large insects from flowering *E. micrococca* at Mt Glorious.

Early stages of *T. nortoni* are not yet known. However there is no reason to suppose that their larval requirements are significantly

different from other species of the genus. Illidge (1917) observed a flying female enter a hollow in a standing tree which was subsequent felled and the female extracted from where it had penetrated down the core to near the base of the tree. Illidge describes the tree as a "dark yellow wood" which may be the rainforest species now known as the "deep yellow wood", *Rhodospaera rhodanthema* (F. Muell.) Engl. At Mt Glorious a specimen has been observed hovering about the open ends of dead, hollow branches of a tall *Eucalyptus grandis* W. Hill ex Maiden, presumably seeking an oviposition site.

Eight ova were dissected from one female collected at Mt Glorious, each measuring 3.5 mm x 2.0 mm. This somewhat worn specimen was taken in March, by which time many of its eggs would have been laid, so eight eggs is not to be considered a complete egg batch.

Trichaulax marginipennis (Macleay)

(Figs 11-14, 20, 23)

Schizorhina marginipennis Macleay, 1863: 13

Adult (Figs 20, 23)

This is the largest species of *Trichaulax* (males, length 29-34 mm, width 17-19 mm; females, length 29-35 mm, width 17-21 mm).

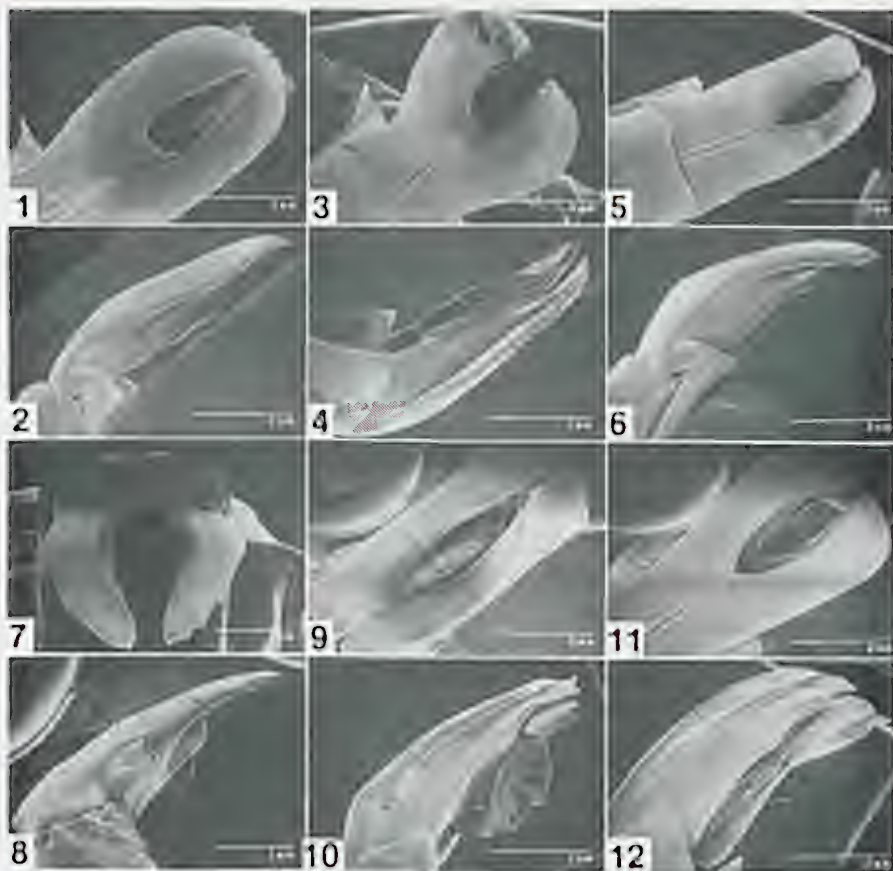
The derm is black, and the dorsal sulci are very shallow, so much so that in most specimens examined the vestiture is abraded away in these areas, leaving only the outer perimeter of the elytra clothed in short, velvety, off-white vestiture. The venter is more evenly clothed. It can be separated from *T. nortoni* by short pale vestiture on the elytral apices and the relatively naked pygidium. In addition, the lateral edges of the elytra of *T. marginipennis* are broadly vested whereas the corresponding area of *T. nortoni* is very narrow.

The male genitalia show fine and narrow parameres (Figs 11, 12).

Material examined

Queensland: 1?, Banana (AM); 2♂, 3♀, Brisbane (JHT, QM, UQIC); 1♀, Brookfield, Brisbane (QDPI); 1♂, Bulimba, Brisbane (UQIC); 1♂, 1♀, ex larva, Indooroopilly, Brisbane (QDPI); 3♂, Willawong, Brisbane (QM); 1♂,

Figs 1-14. 1-12 male genitalia in dorsal and lateral views: 1-2, *Trichaulax philipsii* (Mt Garnet); 3-4, presumed hybrid between *T. philipsii* and *T. macleayi* (Mt Garnet); 5-6, *T. macleayi* (Mt Garnet); 7-8, *T. concinna* (Camooweal); 9-10, *T. nortoni* (Mt Glorious); 11-12, *T. marginipennis* (Willawong). Fig. 13, larva of *T. marginipennis* (Indooroopilly). Fig. 14, pupal cells and adult of *T. marginipennis* (Willawong).



Brookstead (PGA); 4♂, 1♀, Clermont (QM); 2♂, 1♀, Duaranga (AM, ANIC, UQIC); 3♂, 3♀, Edungalba (AH, AM, ANIC, QM); 1♀, Hambleton (QM); 3♂, Beacon Hill, nr Imbil (RE); 3♂, 1♀, 60 km SW Ingham (AH); 1♂, Longreach (QM); 1♂, 1♀, Millmerran (ANIC); 1♀, Mt Walker, via Rosewood (QM); 1♂, Palm Is (ANIC); 1♀, Peak Downs, via Capella (AH); 1♀, Port Denison (AM); 7♂, 5♀, Rockhampton (ANIC, JHT, UQIC); 1♀, North Stradbroke Is (JS); 1♀, Toowoomba (JS); 1♀, Woodstead (JHT); 5♂, 3♀, Woodstock (ANIC, QM); 1♀, Yandilla (QM). *New South Wales*: 1♀, Armatree, K31650 (AM); 1♀, Glenreagh (AM); 1♀, Moree (ANIC). 8♂, 8♀, no data (AH, AM, ANIC, JS, QDPI, QM).

Distribution

T. marginipennis is known from 60 km south-west of Ingham, northern Queensland, south to Armatree, 100 km north of Dubbo in central western New South Wales. The western-most record is Longreach, Queensland. The species favours drier inland areas, occurring over a wider range than *T. nortoni*, but co-existing with *T. philipsii* in the south and *T. macleayi* in the north. It is active from December to April, with most specimens being taken in February.

Biology

Adults feed at blossom, often of *Eucalyptus*, but seldom has the tree species been identified. G. Brooks recorded *E. ochrophloia* F. Muell. as a nectar source (in Willemstein 1978) and *Bursaria spinosa* Cav. was noted by E.E. Adams at Edungalba, Queensland. Near Grafton, New South Wales, a specimen was taken on flowers of *Eucalyptus maculata* Hook. (pers. comm. R. Wylie).

Larval host trees are better known for *T. marginipennis* than for any other *Trichaulax* species. They have been identified as: *Lophostemon confertus* (R. Br.) P. Wilson, Indooroopilly, Qld. (pers. comm. M. De Baar); *Flacourtia jangomas* (Lour.) Rauschel (Illidge 1917); *Eucalyptus maculata*, Indooroopilly, Qld (Cantrell 1979).

Fig. 13 depicts a preserved specimen of the large curled larva from the Indooroopilly site. Several were found, together with larvae of *T. philipsii*.

Four pupal cells, each containing a desiccated adult, were found at Willawong on the southern outskirts of Brisbane, by D. Libke in April 1985. These were in a hollow limb of a dying *Eucalyptus robusta* Smith, 15 m above ground in *Eucalyptus* forest with *Melaleuca* understorey. The tree was seen to be dying in September and was felled in December 1984. It was hollow and filled with red earthy pulp. The pupal cells were found in April 1985 in a group 4-6 cm apart, tightly adhering to the inside wall of a hollow limb 12 cm from the opening in which an abandoned duck nest had been situated.

Probably due to the now horizontal position of the trunk excluding rain from the extremely hard and tough pupal cells, the adults had failed to break out from them. One cell was discarded by the finder, one, together with the dead adult insect, is lodged in QM, and the remaining two, together with their male occupants are held in AH. These last two are black, ovate, rough in texture and measure approximately 4.5 x 2.8 cm and 4.5 x 3 cm respectively (Fig. 14).

Trichaulax concinna (Janson)

(Figs 7, 8, 18)

Schizorhina concinna Janson, 1873: 134, pl. 6, fig. 3.

Adult (Fig. 18):

A small species, (males length 18-22 mm, width 11-14 mm; females length 19-22 mm, width 12-13 mm).

This is the only green *Trichaulax* species, the least known, very few specimens having been taken since the species was first described in 1873.

The vestiture is off-white, the isolated sulcus on each elytron is angled sharply towards the outer posterior angles of the pronotum, and the scutellum is indented. The pygidium is sparsely scaled, and the ventral clothing margins the overlap of each sternite. The genitalia are shown in Figs 7 and 8.

Material examined

Queensland: 2♂, 35km E of Camooweal (QDPIM); 1♂, 1♀, 2?, 100km NW of Mt Isa (AH, QDPI, WH). *Western Australia*: 2?, Carnot Bay, Broome (MV). 1♀, no data, ex Dodd Coll. (QM).

Distribution

The type locality is Nicol Bay, east of Dampier, WA. Carnot Bay is situated 90 km north of Broome, WA. A further specimen was taken at Broome in July 1987 (pers. comm. G. Wood). All other records are for Queensland, the major one being 100 km NW Mt Isa (= 35 km E of Camooweal, Qld), and the most recent is of a single specimen from Hughenden, Qld in April 1989 (pers. comm. J. Hasenpusch). Such an apparently disjunct distribution is questionable, and the occurrence of the species at intermediate localities in the Northern Territory is to be expected. However to date I have not examined any *Trichaulax* from there.

Biology

T. concinna was abundant at Camooweal during March 1976 feeding on *Eucalyptus* blossom (pers. comm. R.I. Storey), while the

Hughenden, Qld record is for April. This would indicate that the date of July for the 1987 specimen from Broome, WA requires confirmation. As yet the immature stages remain unrecorded.

Illidge (1917) found adults of *T. concinna* in a hollow eucalypt at the "Kelvin Grove scrub", now in suburban Brisbane. Since the species has not subsequently been recorded in this region this identification requires confirmation. As discussed later, it may have been *T. philipsii*.

Trichaulax macleayi Kraatz stat.rev.

(Figs 5, 6, 17)

Trichaulax macleayi Kraatz 1894: 255.

Trichaulax philipsii var. *macleayi* Schenkling 1921: 187.

Trichaulax sericea Janson 1905: 17, new synonymy.

Adult (Fig. 17)

A striking species with polished black derm and profuse bright rust-red vestiture, *T. macleayi* is variable in size, (males, length 24-31 mm, width 14-17 mm; females, length 24-33 mm, width 14-20 mm). The three specimens from Papua New Guinea are the smallest male examined and the two largest females. All bear coarser, longer vestiture than Australian specimens. In Janson's 1905 description of *T. sericea* he separates it from *T. macleayi* by the following features:

"narrower form, head less shiny, clypeus narrower, more closely and shallowly punctured, more parallel-sided. Thorax silky and subopaque and more sparsely punctured, the basal lobe narrower and more deeply emarginate. Scutellum distinctly narrower, and more acutely produced at its apex. Hairs in the sulci and at the margin of the elytra longer and of a yellow colour."

Comparison of three recent specimens from Papua New Guinea with a long series of northern Queensland material indicates that the above differences listed by Janson are insufficiently marked to justify separation of the PNG populations from those of northern Queensland. Regarding Janson's reference to a yellow colour of vestiture, only one of the three PNG specimens exhibits this colour, and that specimen, a female, is much abraded. Such a degree of abrasion and wear is often accompanied by fading in the colour of the vestiture. The remaining male and female bear rust red vestiture of the same shade as that of material from northern Queensland.

Janson continued:

". . . pygidium only sparsely pilose at the base and apex, and underside also more sparsely pubescent and centre of abdomen is impunctate and entirely without hairs."

Several specimens from various northern Queensland localities exhibit those criteria, and indicate the difficulties that may be encountered when relying on a variable feature as a taxonomic character. The genitalia of the New Guinea male compares well with those of males from northern Queensland. The type locality for Janson's material was "Babooni Village, 3600 ft [= 1100 m], British New Guinea" and the collector A.E. Pratt. This is probably "Bebeni", a village at about the correct altitude near Mt Lotili in the Goilala region north of Port Moresby where Pratt collected (Frodin and Gressitt 1982).

In areas where both *T. macleayi* and *T. philipsii* occur, such as at Mt Garnet, specimens of intermediate colour of vestiture (Fig. 16) are found (pers. comm. J. Hasenpusch). As these intermediate specimens have been recorded only in the small area of overlap between the species I consider them to be hybrids. They have the derm black as does *T. philipsii* and genitalia vary in form between both species (Figs 3, 4). Another interesting specimen with dark green derm and orange vestiture was taken in April 1988 near Laura, northern Queensland by S. Lamond. The genitalia are closer to *T. macleayi* than to *T. concinna* but the specimen has the indented scutellum of *T. concinna*, and may be a hybrid between these two species. Normal *T. macleayi* with a black derm were present on the same tree, and *T. concinna* could be expected to occur there.

The male genitalia (Figs 5, 6) has parameres of parallel thickness for much of their length.

Material examined

Queensland: 4♂, 4♀, 1?, Cairns (AM, JHT, JS, QM, UQIC); 1♂, Cape Tribulation (AH); 1♀, Mt Carbine (JS); 2♀, 1?, Cooktown (AM, JS, QM); 1♂, W of "Fairview", near Laura (AH); 6♂, 1♀, Mt Garnet (AH, JH) (includes 3 intermediates between *T. macleayi* and *T. philipsii*); 1♂, Gordonvale (PGA); 6♂, 1♀, Hambleton (QM); 1♂, Kuranda (ANIC); 1♀, Lake Placid (QM); 1♂, Laura (SL) (intermediate between *T. macleayi* and *T. concinna*); 7♂, 3♀, Mt Molloy (AH); 1♀, Woodstock (QM); 1♀, Yule Point (AH). *Papua New Guinea*: 1♂, 2♀, no other data (AH). 5♂, 6♀, 18? no data (AM, ANIC, JHT, MV, QDPI, QM, UQIC).

Distribution

All records so far are from northern Queensland and Papua New Guinea, with no material available from Cape York Peninsula. Mt Garnet appears to be the southern limit for *T. macleayi* and I have seen no more western specimens, despite Kraatz's type being thought to have come from Western Australia (Lea 1914).

Biology

This species is by no means uncommon in northern Queensland and has been collected from December through to April, with most records

for February and March. At Mt Molloy, northern Queensland, it was active on blossom for fourteen days in February 1987 (pers. comm. G. Wood). In PNG it has been taken in February and May. *Eucalyptus* blossom is much favoured as a nectar source by adults. Brooks (in Willemstein 1978) lists *E. acmenoides* Schauer, *E. gummifera* (Gaertner) Hochr. and *E. ochrophloia* F. Muell. as flower records. At Cape Tribulation and Trinity Beach, northern Queensland, adults have been taken on the blossom of *Euodia elleryana* F. Muell (pers. comm. S. Lamond). Larvae have been reared from a hollow log full of dirt and detritus on the ground on Rat Island in the Barron River (pers. comm. A. Walford-Huggins). These emerged as adults on the 10 January 1972. This is an interesting record, as it is the only one for any *Trichaulax* utilising fallen timber, provided of course, that the larvae or ova were not already present in the log before it fell.

Trichaulax philipsii (Schreibers)

(Figs 1, 2, 15, 21)

Cetonia philipsii Schreibers 1802: 193, pl. 20, fig. 4.

Cetonia carinata Donovan 1805: [2].

Schizorhina schreibersii Thomson 1878: 22.

Schizorhina donovani Thomson 1878: 23.

Schizorhina kirbyi Thomson 1878: 22.

Adult (Figs 15, 21)

A medium sized species (males, length 20-26 mm, width 12-17 mm; females, length 24-29 mm, width 14-18 mm). In this species the colour of both the derm and vestiture varies between localities. The southern populations have a black derm and white vestiture, material from northern NSW and southern Queensland is brown in derm (particularly pale on the pronotum) with ochraceous vestiture, and the northern Queensland populations are very dark brown, almost black derm with pale golden vestiture. Presumed hybrids between *T. macleayi* and *T. philipsii* have been discussed above.

The parameres are broader than those of *T. macleayi* (Figs 1 and 2)

Figs 15-23. Adults of *Trichaulax* species: 15, *T. philipsii* (Mt Garnet); 16, presumed hybrid between *T. philipsii* and *T. macleayi* (Mt Garnet); 17, *T. macleayi* (Mt Garnet); 18, *T. concinna* (Camooweal); 19, *T. nortoni* (Mt Glorious); 20, *T. marginipennis* (Ingham); 21, *T. philipsii* (Mt Glorious); 22, *T. nortoni* (Mt Glorious); 23, *T. marginipennis* (Peak Downs).



and this is helpful in separating material from northern Queensland.

Material examined

Queensland: 1♀, Beenleigh (QM); 1♀, Blackdown Tableland (QM); 1♀, Indooroopilly, Brisbane (QDPI); 2?, Duaranga (AM); 3♂, 3♀, Dunmore (AH); 1♀, Expedition Range (ANIC); 3♂, 1♀, Mt Garnet (AH, JH); 1♀, Glen Aplin (QDPI); 7♂, 1♀, Mt Glorious (AH); 1♀, Macleay Island, Moreton Bay (AH); 1♀, Mary River (UQIC); 1♂, 1♀, 3?, Millmerran (AM, ANIC); 2♂, Mt Nebo (AH, JS); 1♂, Redland Bay (UQIC); 4♂, 1♀, Mt Spec (AH, ANIC, QM); 1♂, Theodore (QM); 1♀, Tiberowuccum (RE); 1♀, Townsville (AH); 1♀, Upper Cedar Creek, Samford (UQIC); 1♂, Yandilla (QM). *New South Wales*: 1♂, Amosfield (JHT); 1♀, 1?, Blackheath (AM, ANIC); 1?, Blue Mts (AM); 1?, Caldwell (AM); 2♀, Helensburg (JHT, JS); 1?, Kosciusko (AM); 2♂, 2♀, 5?, Sydney (AM, ANIC, QDPI, UQIC); 1♀, Mt Tinderry (ANIC). *Australian Capital Territory*: 1♀, Canberra (ANIC). *Victoria*: 1♀, Blairgowrie (AH); 1♀, Ferny Hills (JS); 1♀, Mizpah Rd (ANIC); 1♂, Portland (AH); 1♂, Rokeby (ANIC); 1♂, Russels Creek (ANIC); 2♂, 2♀, Upper Tamil River (ANIC). *South Australia*: 2?, Kangaroo Island (AM). *Western Australia*: 1♂, Lake Grace (AH); 3♀, Parkerville, 300 km N of Perth (AH); 1♂, Kojanup (AH); 1?, Salt River (AM). 3♂, 3♀, no data (AH, ANIC, JS, QDPI, UQIC).

Distribution

From Mt Garnet, northern Queensland to Portland, Vic., and with records from Nuriootpa (Matthews 1984) and Hahndorf, SA (Lea 1914), *T. philipsii* enjoys the widest range of any *Trichaulax*. It appears to be uncommon in the northern part of its range. Material from the southern part of Western Australia is tentatively included here but may warrant further study. The specimen from Hahndorf SA is referred to by Lea (1914) as variety *kirbyi*.

Biology

The nectar sources for this widespread species are little better known than for other species. At Mt Glorious, *Eucalyptus eugenioides* Sieber ex. Sprengle, *E. intermedia* R. Baker and *Euodia micrococca* F. Muell. (Fig. 21) are all utilised, while at Dunmore, *Eucalyptus exserta* F. Muell. and *Angophora costata* (Gaertner) J. Britten are favoured. At Portland, Vic. a species of *Leptospermum* has been recorded (pers. comm. S. Lamond).

Cantrell (1979) noted *Eucalyptus maculata* Hook as a larval host at Indooroopilly, south-eastern Queensland and K. Hiller, has found puparia, one containing a desiccated adult, in a fallen *E. saligna* Smith at Mt Glorious. Illidge (1917) recorded adults of *T. concinna* from the interior of a moribund *Eucalyptus* at Kelvin Grove, Brisbane, but it is more likely that the species involved was *T. philipsii*.

Discussion

This work will enable identification of species in a genus which has hitherto remained somewhat neglected and confusing. There are vast areas such as the Northern Territory and Cape York Peninsula where members of the genus must occur, but from which there are still no records. Further collecting in these areas is vital if a greater understanding of the distribution of the species is to be achieved and I would be happy to see material from these areas.

Trichaulax are difficult to collect as they feed high in trees. This can be partially overcome by the construction of very long net handles and by various tree climbing techniques, but none will provide total access. A good pair of binoculars is a vital aid to locating specimens.

Collected material needs to be treated with more care than that of most other groups, as the vestiture is subject to abrasion and staining. If material is to be kept alive for photography or behavioural study, single specimens should be kept in clear plastic vials fitted with a fine metal mesh lid. These can be held until required in a field container which has a compartment for dry ice. This will reduce the specimen's activity and minimise damage. At ambient temperature, the specimen will soon become active again, and continue its normal activities. In many of the inland areas where *Trichaulax* occurs the temperature at night can drop considerably, so an artificially induced change in temperature causes no ill effects.

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